

## CLAIMS

What is claimed is:

1        1. A manufacturing method of a fluid jetting apparatus, comprising:  
2              forming a heat driving part, a membrane, and a nozzle part; and  
3              forming a nozzle and jetting fluid chambers sequentially by using one nozzle plate, and  
4              assembling the heat driving part, the membrane, and the nozzle part, sequentially.

1        2. The manufacturing method as claimed in claim 1, wherein the forming of the  
2              nozzle comprises:

3              laminating the nozzle plate on a substrate;  
4              forming the nozzle in the nozzle plate; and  
5              forming the jetting fluid chambers by extending the nozzle in a direction.

1        3. The manufacturing method as claimed in claim 2, further comprising separating  
2              the nozzle plate from the substrate.

1        4. The manufacturing method as claimed in claim 2, wherein the nozzle plate is  
2              adhered to the substrate through the laminating of the nozzle plate on the substrate, the  
3              manufacturing method further comprising abrading the nozzle plate to have a predetermined  
4              thickness before the forming of the nozzle in the nozzle plate.

1        5. The manufacturing method as claimed in claim 4, wherein the abrading of the  
2              nozzle plate comprises chemo-mechanical polishing the nozzle plate to have the predetermined  
3              thickness.

1        6. The manufacturing method as claimed in claim 2, wherein the nozzle plate is  
2              made of silicon.

1           7. The manufacturing method as claimed in claim 2, wherein the forming of the  
2 nozzle and the jetting fluid chamber are performed through a lithography, respectively.

1           8. The manufacturing method as claimed in claim 2, wherein the forming of the  
2 jetting fluid chamber comprises performing an anisotropic etching of the lithography.

1           9. The manufacturing method as claimed in claim 3, further comprising separating  
2 the nozzle plate and the substrate after assembling the heat driving part, the membrane, and the  
3 nozzle part sequentially.

1           10. The manufacturing method as claimed in claim 1, wherein the forming of the  
2 nozzle and jetting fluid chambers are performed prior to assembling the nozzle part to the  
3 membrane.

1           11. The manufacturing method as claimed in claim 1, wherein the assembling of the  
2 nozzle part to the membrane comprises using an adhesive or an anodic bonding to fix the  
3 nozzle part to the membrane.

1           12. The manufacturing method as claimed in claim 2, wherein the laminating of the  
2 nozzle plate on the substrate comprises:

3           forming an insulated layer on the substrate; and  
4           using an adhesive or an anodic bonding to fix the nozzle plate to the insulated layer.

1           13. A manufacturing method of a fluid jetting apparatus, comprising [the steps of]:  
2           forming a heat driving part, a membrane, and a nozzle part; and  
3           assembling the heat driving part, the membrane, the nozzle part, sequentially, the step  
4           assembling of the heat driving part, the membrane, and the nozzle part comprising:  
5           laminating a nozzle plate of silicon on a substrate,

6                   abrading the nozzle plate to have a predetermined thickness by a chemo-  
7                   mechanical polishing,

8                   forming a nozzle through a lithography,

9                   forming a jetting fluid chamber on an area where the nozzle is formed by an  
10                  anisotropic etching of the lithography, and

11                  separating the nozzle plate from the substrate.

1                  14.       The manufacturing method as claimed in claim 10, wherein the forming of the  
2                  nozzle and the jetting fluid chambers further comprises assembling the nozzle plate to the  
3                  membrane subsequent to the forming of the jetting fluid chamber and prior to the separating of  
4                  the nozzle plate from the substrate.

1                  15.       A method of manufacturing a fluid jetting apparatus, comprising:  
2                  forming a nozzle and jetting fluid chambers in a single piece nozzle plate; and  
3                  attaching the nozzle plate with the nozzle and jetting fluid chambers formed therein to a  
4                  membrane of a membrane-heat driving part assembly.

1                  16.       The method as claimed in claim 15, wherein the forming of the nozzle and  
2                  jetting fluid chambers comprises:

3                  forming the nozzle in the nozzle plate; and

4                  forming the jetting fluid chambers by extending the nozzle in a depth direction.

1                  17.       The method as claimed in claim 16, wherein the forming of the nozzle and  
2                  jetting fluid chambers comprises attaching the nozzle plate to a substrate prior to forming the  
3                  nozzle on the nozzle plate.

1                  18.       The method as claimed in claim 17, further comprising:

2                  separating the nozzle plate from the substrate subsequent to the attaching of the nozzle  
3                  plate to the membrane.

1           19. The method as claimed in claim 17, further comprising abrading the nozzle  
2 plate to a predetermined thickness subsequent to attaching the nozzle plate to the substrate and  
3 prior to forming the nozzle on the nozzle plate.

1           20. The method as claimed in claim 16, wherein:  
2           the forming of the nozzle is performed by lithography; and  
3           the forming of the jetting fluid chambers is performed by an anisotropic etching in a  
4 vertical direction of the nozzle plate, to etch a surface of the nozzle plate to a uniform depth  
5 and simultaneously fully form the nozzle.

1           21. A method of manufacturing a fluid jetting apparatus, comprising:  
2           attaching a nozzle plate to a first substrate and forming a nozzle and jetting fluid  
3           chambers in the nozzle plate attached to the first substrate; and  
4           attaching the nozzle plate attached to the first substrate to a membrane attached to a  
5 heat driving part which is attached to a second substrate; and  
6           removing the first substrate from the nozzle plate subsequent to the attaching of the  
7 nozzle plate to the membrane.

1           22. The method as claimed in claim 21, wherein the membrane attached to the heat  
2 driving part which is attached to the second substrate is formed by a method of:  
3           attaching the heat driving part to the second substrate; and  
4           attaching the membrane to the heat driving part attached to the second substrate.

1           23. The method as claimed in claim 21, wherein the forming of the nozzle and the  
2 jetting fluid chambers in the nozzle plate comprises:  
3           forming the nozzle in the nozzle plate; and  
4           forming the jetting fluid chambers by extending the nozzle in a depth direction.

1           24. The method as claimed in claim 23, wherein the nozzle plate is a single piece of  
2 silicon.

1           25. The method as claimed in claim 23, further comprising abrading the nozzle  
2 plate prior to forming the nozzle in the nozzle plate.

1           26. The method as claimed in claim 23, wherein the forming of the nozzle and the  
2 forming of the jetting fluid chambers are performed through a lithography.

09-152-3269